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January 26, 1998

98-RF-00366

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**TRANSMITTAL OF THE QUARTERLY STATUS REPORT FOR THE CONSOLIDATED WATER
TREATMENT FACILITY - JEL-012-98**

Rocky Mountain Remediation Services is pleased to deliver the attached copy of the Quarterly Status Report for Work Package B891 Groundwater Treatment Facility, 1 in fulfillment of the scheduled milestone due January 29, 1998. The task includes operations, maintenance and reporting activities for the Consolidated Water Treatment Plant and OU7 Passive Seep Interception and Treatment System.

If there is any additional information you would like to have incorporated into the existing format for next quarter's report or clarification of the current report, please do not hesitate to contact J. R. (Russ) Cirillo on extension 5876 or digital pager 4011.

John E. Law
Director
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Orig. and 1 cc - N. I. Castañeda

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QUARTERLY REPORT
CONSOLIDATED WATER TREATMENT FACILITY
AND
OU7 PASSIVE SEEP INTERCEPTION AND
TREATMENT SYSTEM

FOR OCTOBER THROUGH DECEMBER 1997
INCLUDING DATA SUMMARY FOR
JULY THROUGH SEPTEMBER 1997

Rocky Mountain Remediation Services, L.L.C.

January 1998

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SECTION A - CONSOLIDATED WATER TREATMENT FACILITY

1.0 INTRODUCTION

The CWTF went on-line February 29, 1996. The CWTF is designed as a comprehensive facility combining individual IM/IRA treatment activities in order to reduce cost, increase efficiency, and offer treatment options to the Rocky Flats Environmental Technology Site (RFETS) in support of on-going Environmental Restoration (ER) activities and remediations.

The Consolidated Water Treatment Facility (CWTF) consists of the following specific unit operations:

- Chemical precipitation (T-900A/T-900B);
- Cross-flow membrane microfiltration (T-900A/T-900B);
- Ultraviolet Light/Hydrogen Peroxide Oxidation (Building 891);
- Granular Activated Carbon (Building 891); and
- Ion Exchange (Building 891).

A portable clay absorbent media drum is also available for use at the CWTF during water transfers from tanker trucks to CWTF influent storage tanks as a pretreatment of oily wastewaters. Waters are processed through the various CWTF unit treatment operations based on knowledge of the influent water characteristics in order to maximize treatment and reduce handling costs and waste generation.

The CWTF currently treats contaminated water from the following sources:

- OU1 groundwater and OU2 surface water;
- Decontamination water from the Main Decontamination Facility (MDF) and Protected Area Decontamination Facility (PADF);
- Other ER waters (e.g., purge water, water pumped from containments, etc.); and
- Waters from ER Accelerated Action Projects.

The CWTF flowpath is flexible enough to allow waters to be treated through particular unit processes as necessary, and to allow for re-treatment if necessary.

2.0 CWTF OPERATIONS (October, November, December 1997)

2.1 QUANTITIES OF WATER COLLECTED AND TREATED

Table 2-1 summarizes the quantities of water treated at the CWTF for the period October through December 1997. During this period the CWTF accepted water from the following sources:

- OU1 French Drain Sump
- OU1 Collection Well
- OU2 Surface Water Station SW-59
- Snow melt/rain water pumped from CWTF containments
- MDF and PADF Water

As can be seen from Table 2-1, a total of approximately 83,342 gallons of water were treated through the Building 891 Ion Exchange Columns from October 1, 1997 through December 31, 1997. Approximately 51,400 gallons of the total water volume were treated through the chemical precipitation/microfiltration trailers.

Please note that because the CWTF is equipped with three Influent Tanks, the amount of water treated may be less than or greater than the amount of water collected for any given period.

During the period from October through December 1997, treated water was not released to the South Interceptor Ditch (SID).

As of December 31, 1997, approximately 4,014,371 gallons of water has been processed through the Building 891 Ion Exchange Columns.

TABLE 2-1
CONSOLIDATED WATER TREATMENT FACILITY
APPROXIMATE QUANTITIES OF WATER COLLECTED AND PROCESSED a/

| Month/Year | Gallons Collected from the OU1 French Drain Sump b/ | Gallons Collected from the OU1 Collection Well b/ | Gallons Accepted at Bldg 891 from the MDF and Other Sources c/ | Gallons Pumped from Bldg. 891 Containments | Gallons Collected from the OU2 SW-59 | Gallons Processed through T900A/T900B | Gallons Processed through GAC at Bldg 891 | Gallons Processed through IX at Bldg 891 |
|---------------------|---|---|--|--|--------------------------------------|---------------------------------------|---|--|
| Jan-97 | 1,125 | 815 | 0 | 1,280 | 2,297 | 0 | 0 | 0 |
| Feb-97 | 4,865 | 840 | 0 | 2,970 | 2,811 | 7,144 | 23,418 | 14,377 |
| Mar-97 | 8,385 | 1,210 | 3,400 | 3,176 | 2,360 | 0 | 10,102 | 17,874 |
| 1st Quarter Totals | 14,375 | 2,865 | 3,400 | 7,426 | 7,268 | 7,144 | 33,520 | 32,051 |
| Apr-97 | 20,872 | 1,055 | 28,814 | 19,197 | 2,156 | 0 | 57,936 | 57,903 |
| May-97 | 15,112 | 785 | 11,402 | 3,011 | 3,857 | 46,976 | 29,459 | 50,397 |
| Jun-97 | 11,183 | 670 | 5,950 | 4,137 | 3,110 | 7,200 | 0 | 0 |
| 2nd Quarter Totals | 47,167 | 2,510 | 46,166 | 26,345 | 9,123 | 54,176 | 87,395 | 108,300 |
| Jul-97 | 4,575 | 2,160 | 9,740 | 5,810 | 5,977 | 20,694 | 40,152 | 37,143 |
| Aug-97 | 22,314 | 1,240 | 33,159 | 15,378 | 2,709 | 25,075 | 67,164 | 76,452 |
| Sep-97 | 7,450 | 1,610 | 10,578 | 5,047 | 4,894 | 12,878 | 23,501 | 14,181 |
| 3rd Quarter Totals | 34,339 | 5,070 | 53,477 | 26,235 | 13,580 | 58,647 | 130,817 | 127,758 |
| Oct-97 | 7,735 | 1,695 | 5,906 | 10,669 | 2,580 | 8,512 | 25,012 | 36,215 |
| Nov-97 | 16,660 | 585 | 0 | 2,390 | 4,820 | 21,850 | 0 d/ | 26,201 |
| Dec-97 | 16,100 | 845 | 4,042 | 1,190 | 1,960 | 21,038 | 0 d/ | 20,926 |
| 4th Quarter Totals | 40,495 | 3,125 | 9,948 | 14,249 | 9,160 | 51,400 | 25,012 | 83,342 |
| Year-to-Date Totals | 95,881 | 10,385 | 103,043 | 10,006 | 29,971 | 171,367 | 276,744 | 351,449 |

a/ Please note that because the CWTF is equipped with Influent Tanks, the quantity of water collected will not necessarily equate to the quantity of water processed. Also note that a 15,000 gallon surge tank (T-203) is in-line between the UV/GAC unit processes and IX #1, and therefore the quantity of water processed through UV/GAC will not equate to the quantity of water processed through IX.

b/ This ground water is collected each operating day (i.e., 5 days per week).

c/ Other sources may include purge water, ER Accelerated Action Project water, etc., such as the Mound Excavation, Mod Lab, or water collected in the B-750 Steam Pit.

d/ No UV/H₂O₂ effluent was treated through the GAC.

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2.2 CHEMICAL USAGE

The following chemicals are utilized during wastewater treatment operations at the CWTF:

- Building 891
 - Hydrogen peroxide (UV oxidation)
 - Hydrochloric acid (ion exchange regeneration and pH adjustment)
 - Sodium hydroxide (ion exchange regeneration)
- T-900A/T-900B trailers
 - Sulfuric acid (pH adjustment: TK-1 and effluent)
 - Calcium hydroxide (precipitation)
 - Ferric sulfate (precipitation)
 - Hydrogen peroxide (chemical cleaning of filter modules)
 - Sodium hydroxide (pH adjustment: TK-2)

Table 2-2 summarizes the quantities of chemicals utilized during the period of October through December 1997.

2.3 WASTE GENERATION

The following types of waste are generated during normal wastewater treatment operations at Building 891 and the T-900A/T-900B trailers:

- Building 891
 - used filter socks
 - neutralized ion exchange regenerant
 - personnel protective equipment
- T-900A/T-900B trailers
 - filter press sludge cake
 - personnel protective equipment
 - used filter membranes

Table 2-3 summarizes the types and quantities of the waste generated during wastewater treatment operations at the CWTF for the fourth quarter of 1997. From October 1, 1997 through December 31, 1997, 8,686 gallons of neutralized regenerant water from Tank 210 were sent to the Building 374 evaporator for processing.

TABLE 2-2
CONSOLIDATED WATER TREATMENT FACILITY
CHEMICAL USAGE

| Month/Year | Building 891 | | | | T-900A/T-900B | | | | |
|---------------------|---------------------------------|--------------------------------|---------------------------------|--------------------------------|----------------------------|-------------------------|---------------------------------|--------------------------------|-------------------------------|
| | Hydrochloric Acid 36% (gallons) | Sodium Hydroxide 50% (gallons) | Hydrogen Peroxide 50% (gallons) | Sulfuric Acid a/ 98% (gallons) | Calcium Hydroxide (pounds) | Ferric Sulfate (pounds) | Hydrogen Peroxide 35% (gallons) | Sodium Hydroxide 50% (gallons) | Sodium Hypochlorite (gallons) |
| Jan-97 | 0.0 | 66.0 | 2.0 | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 |
| Feb-97 | 339.0 | 138.0 | 1.9 | 1.5 | 31.4 | 2.5 | 6.3 | 0.0 | 0.0 |
| Mar-97 | 0.0 | 0.0 | 5.7 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 1st Quarter Totals | 339.0 | 204.0 | 9.6 | 1.5 | 31.4 | 2.5 | 6.3 | 0.0 | 0.0 |
| Apr-97 | 170.0 | 120.0 | 1.6 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| May-97 | 122.0 | 69.0 | 0.2 | 3.5 | 66.0 | 8.8 | 25.9 | 4.1 | 0.0 |
| Jun-97 | 0.0 | 0.0 | 0.7 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 2nd Quarter Totals | 292.0 | 189.0 | 2.5 | 3.5 | 66.0 | 8.8 | 25.9 | 4.1 | 0.0 |
| Jul-97 | 0.0 | 0.0 | 0.3 | 3.5 | 78.0 | 9.9 | 6.0 | 5.1 | 0.0 |
| Aug-97 | 0.0 | 105.0 | 0.5 | 4.3 | 94.5 | 12.0 | 7.3 | 0.0 | 0.0 |
| Sep-97 | 0.0 | 0.0 | 0.2 | 2.0 | 24.0 | 3.0 | 5.0 | 0.0 | 0.0 |
| 3rd Quarter Totals | 0.0 | 105.0 | 1.0 | 9.8 | 196.5 | 24.9 | 18.3 | 5.1 | 0.0 |
| Oct-97 | 1.6 | 0.0 | 0.1 | 0.1 | 3.0 | 0.9 | 0.3 | 0.0 | 0.0 |
| Nov-97 | 7.5 | 2.6 | 0.1 | 0.1 | 3.0 | 0.6 | 1.2 | 0.0 | 0.0 |
| Dec-97 | 0.0 | 1.4 | 0.0 | 0.1 | 3.7 | 0.8 | 0.6 | 0.1 | 0.0 |
| 4th Quarter Totals | 9.1 | 4.0 | 0.2 | 0.3 | 9.7 | 2.3 | 2.0 | 0.1 | 0.0 |
| Year-to-Date Totals | 640.1 | 498.0 | 13.2 | 15.2 | 303.6 | 38.6 | 52.5 | 9.3 | 0.0 |

a/ In addition to the sulfuric acid quantity listed in this column, occasionally a small amount (approximately 1 gallon per effluent tank) of sulfuric acid is used in Building 891 for effluent pH adjustment.

TABLE 2-3
CONSOLIDATED WATER TREATMENT FACILITY
WASTE GENERATION

| Month/Year | Building 891 | | | T-900A/T-900B | | | | Bldg 891/T-900A/T-900B | |
|---------------------|----------------------------|---|---------------------|---------------------------------|--------------------|-------------------------------------|---|------------------------|--|
| | Filter Socks (55-gal drum) | Neutralized Regenerant to 374 (gallons) | Spent Media (drums) | Sludge Production (55-gal drum) | Spent GAC (pounds) | Used Filter Membranes (55-gal drum) | Personal Protective Equip. (55-gal drum) a/ | | |
| Jan-97 | -- | 4,136 | 0 | 0 | 0 | 0 | -- | | |
| Feb-97 | -- | 4,737 | 0 | 0 | 0 | 0 | -- | | |
| Mar-97 | -- | 4,550 | 0 | 0 | 0 | 0 | -- | | |
| 1st Quarter Totals | 0 | 13,423 | 0 | 0 | 0 | 0 | 2 drums | b/c/ | |
| Apr-97 | | 0 | 0 | 0 | 0 | 0 | -- | | |
| May-97 | | 9,099 | 0 | 0 | 0 | 0 | -- | | |
| Jun-97 | -- | 0 | 0 | 0 | 0 | 0 | -- | | |
| 2nd Quarter Totals | d/ | 9,099 | 0 | 0 | 0 | 0 | -- | | |
| Jul-97 | -- | 0 | 0 | 0 | 0 | 0 | -- | | |
| Aug-97 | -- | 0 | 0 | 0 | 0 | 0 | -- | | |
| Sep-97 | -- | 0 | 0 | 0 | 0 | 0 | -- | | |
| 3rd Quarter Totals | 0 | 0 | 0 | 0 | 0 | 0 | -- | | |
| Oct-97 | -- | 4,738 | 0 | 0 | 0 | 0 | -- | | |
| Nov-97 | -- | 0 | 0 | 0 | 0 | 0 | -- | | |
| Dec-97 | -- | 3,948 | 0 | 0 | 0 | 0 | -- | | |
| 4th Quarter Totals | 0 | 8,686 | 0 | 0 | 0 | 0 | -- | | |
| Year-to-Date Totals | 0 | 31,208 | 0 | 0 | 0 | 0 | 2 | | |

a/ PPE is monitored for radiological contaminants, and if determined to be acceptable for unrestricted release, is sent to the Rocky Flats landfill for disposal. Until the acceptance of water from an ER Accelerated Action Project in February 1996, no PPE from Building 891 or the T-900A/T-900B trailers had been found to be radiologically contaminated.

b/ PPE is collected from water treatment operations, MDF decontamination operations, etc. and is drummed collectively.

c/ These drums are filled gradually, and therefore only quarterly totals are reported.

d/ Used filter socks are drummed with other compatible wastes generated onsite, therefore the drums generated cannot be tracked.

SECTION A - CONSOLIDATED WATER TREATMENT FACILITY

3.0 INFLUENT AND EFFLUENT SAMPLING (July, August, September 1997)

3.1 OUI FRENCH DRAIN SUMP, COLLECTION WELL, AND BUILDING 881 FOOTING DRAIN CHARACTERISTICS

Collection Well water is now collected separately from the French Drain Sump water, and collection and treatment of water from the Building 881 Footing Drain was discontinued in December 1994. Therefore the current French Drain Sump data is representative of only those waters that seep from the groundwater table into the French Drain. For the July, August, September 1997 period, quarterly sampling was performed at the French Drain Sump, the Collection Well, and the Building 881 Footing Drain.

VOCs, Radionuclides, Metals, and Water Quality for the French Drain Sump, the Collection Well, and the Building 881 Footing Drain have been reviewed and compared to the OUI ARARs. Note that it has historically been assumed that the OUI ARARs for radionuclides and metals are dissolved values. Those constituents which did exceed OUI ARARs include the following:

FRENCH DRAIN SUMP

| Compound | Exceedance Value | Units | OUI ARAR |
|------------------|------------------|-------|----------|
| Selenium (Total) | 56.3 | ug/L | 10 |

COLLECTION WELL

| Compound | Exceedance Value | Units | OUI ARAR |
|-------------------|------------------|-------|----------|
| Tetrachloroethene | 72 | ug/L | 5 |
| Trichloroethene | 740 | ug/L | 5 |
| Selenium (Total) | 673 | ug/L | 10 |

BUILDING 881 FOOTING DRAIN

| Compound | Exceedance Value | Units | OUI ARAR |
|-------------------|------------------|-------|----------|
| Tetrachloroethene | 28 | ug/L | 5 |

The Building 881 Footing Drain is currently being sampled for total radionuclides and metals (refer to DOE letter ER:SRG:10199, dated December 29, 1994).

SECTION A - CONSOLIDATED WATER TREATMENT FACILITY

3.2 OU2 SURFACE WATER CHARACTERISTICS

Presently only SW-59 water is collected and treated. Effective May 6, 1994, the collection and treatment of SW-61 and SW-132 was discontinued as per the authorization obtained on April 24, 1994 from the Environmental Protection Agency (EPA) and the Colorado Department of Public Health and the Environment (CDPHE). Surface water is sampled on a quarterly basis from SW-59, SW-61, and SW-132.

The data for OU2 surface water has been reviewed and compared to the relevant ARARs; it has historically been assumed that the OU2 ARARs for radionuclides and metals are total values. Those constituents which did exceed OU2 ARARs include the following:

SURFACE WATER STATION: SW-59

| Compound | Exceedance Value | Units | OU2-ARAR |
|----------------------|------------------|-------|----------|
| Carbon Tetrachloride | 56 | ug/L | 5 |
| Tetrachloroethene | 19 | ug/L | 1 |
| Trichloroethene | 18 | ug/L | 5 |

SURFACE WATER STATION: SW-61

| Compound | Exceedance Value | Units | OU2-ARAR |
|----------------|------------------|-------|----------|
| Aluminum | 2410 | ug/L | 200 |
| Iron | 3050 | ug/L | 1000 |
| Vinyl Chloride | 4 | ug/L | 2 |

SURFACE WATER STATION: SW-132

| Compound | Exceedance Value | Units | OU2-ARAR |
|---------------|------------------|-------|----------|
| None Detected | | | |

3.3 TREATED EFFLUENT CHARACTERISTICS

Treated effluent from the CWTF is stored in one of three Effluent Storage Tanks prior to discharge. An Effluent Storage Tank is sampled once it is full, and the tank is discharged if the data show that ARARs have not been exceeded.

4.0 ENVIRONMENTAL COMPLIANCE

4.1 PERIODS OF NON-COLLECTION

All collections were performed for the fourth quarter.

4.2 AIR MONITORING

In October 1997, a sulfide odor was detected in Building 891. The GAC vessel was determined to be the source of the odor, which was most-likely caused by a sulfate reducing bacteria. Air monitoring was performed and a recommendation was made to run the exhaust system during processing to eliminate any health risk to workers inside the building. Additional monitoring was performed downwind of the CWTF to ensure the absence of health risks to other Contractor's Yard personnel. GAC was not used during processing for the remainder of the quarter. The GAC vessel is scheduled to go through a cleaning process during the first quarter of 1998.

A sulfide odor was also detected in trailer 900-B. The last of the Mound condensate from Tank 200 was suspected to be the cause of the odor. Additional air flow controls were put in place to increase ventilation of the trailer. Sampling and air monitoring confirmed that there was not a health risk to workers.

SECTION A - CONSOLIDATED WATER TREATMENT FACILITY

5.0 ANTICIPATED OPERATIONS FOR NEXT QUARTER

Collection and treatment of water from the French Drain Sump will continue as normal. Water from the Collection Well will continue to be collected using the portable trailer and transported to the CWTF for off-loading and treatment. Purge, incidental, and decontamination pad waters will continue to be accepted and treated.

Collection of SW-59 weir water into T-59 (the double-walled tank located just south of the SW-59 weir box) began on December 30, 1996. This collected water is now periodically transported to the CWTF via tanker truck.

The CWTF will continue to accept and treat waters from ER Accelerated Action Projects. Projects being supported with water treatment activities include the Trench 1 remediation and 903 Pad Characterization.

Discussions are on-going regarding the sampling of OU-1 and OU-2 locations. In the future, the sampling may be conducted by the groundwater and/or surface water groups in order to incorporate these sites into the appropriate Integrated Monitoring Plan.

SECTION B - OU7 PASSIVE SEEP INTERCEPTION AND TREATMENT SYSTEM

6.0 INTRODUCTION, OPERATIONS, AND SAMPLING

The OU7 Passive Seep Interception and Treatment System (PSITS) is designed to collect and treat OU7 seep water and thereby eliminate, to the extent practicable, the discharge of the FO39-listed waste contained in this seep water to the East Landfill Pond. The collection and treatment system is comprised of the following items:

- A seep interception system.
- A settling basin to remove total suspended solids.
- A bag filtration system consisting of two filters operated in parallel (currently 25 micron bags are in use in the system).
- Two 55 gallon drums of granular activated carbon (GAC) are operated in series to remove volatile organic compounds (VOCs) and semivolatile organic compounds (SVOCs).

During the fourth quarter of 1997, changeout of the bag filters was not required.

There were no periods of system bypass recorded. The EPA will be notified immediately in any instance where bypass continues longer than 72 hours. Periods of bypass less than 72 hours will be documented in this report.

During the fourth quarter of 1997, a treatment study was designed and implemented to evaluate the effectiveness of the system. Based on the conclusions of this evaluation, the treatment will either continue using the current protocols, continue with modifications to the current process, or cease altogether. The sampling and GAC changeouts were performed in accordance with the guidelines of the treatment study. The exact day of sampling was not critical, however, sampling was coordinated with water treatment activities and the sampling schedules for the two study cycles were approximately equivalent.

The actual timeline of sampling was as follows:

| <u>Event</u> | <u>Event Cycle</u> | <u>Sample Date</u> | <u>Analyses</u> |
|-------------------------------|-----------------------|--------------------|-----------------|
| Install two new carbon drums. | Day 0 | August 4, 1997 | None |
| Check system performance. | 9 th day | August 13, 1997 | VOC, SVOC, |
| Check system performance. | 35 th day | September 8, 1997 | VOC, SVOC |
| Check system performance. | 65 th day | October 8, 1997 | VOC, SVOC |
| Start of second study cycle. | 65 th day | October 8, 1997 | None |
| Check system performance. | 72 nd day | October 15, 1997 | VOC, SVOC |
| Check system performance. | 98 th day | November 10, 1997 | VOC, SVOC |
| Check system performance. | 126 th day | December 8, 1997 | VOC, SVOC |

The start of the second study cycle involved removing the lead GAC drum, moving the polishing drum to the lead position, then replacing the polishing drum with a new drum. One more sampling will be conducted in January 1998 to assist with data evaluation. Upon completion of the last sampling, a GAC changeout will be performed. The changeout will be consistent with the original management guidelines established prior to the treatment study.

Those constituents which exceeded the Treatment System Performance Objectives include the following:

**OU-7 PASSIVE SEEP INTERCEPT TREATMENT SYSTEM
OUTFALL (SW00196)**

October 8, 1997

| Compound | Value | Units | Treatment Standard |
|-----------------|--------------|--------------|---------------------------|
| Vinyl Chloride | 2.4 | ug/L | 2 |

December 8, 1997

| Compound | Value | Units | Treatment Standard |
|-----------------------------|--------------|--------------|---------------------------|
| bis(2-ethyl hexyl)phthalate | 3.7 | ug/L | 1.8 |
| Vinyl Chloride | 2.8 | ug/L | 2 |

Appendix A
Data Qualifiers and Descriptions

Selected Laboratory Data Qualifiers and Descriptions

| <u>Qualifier</u> | <u>Description</u> |
|------------------|--|
| B | < method detection limit but >= instrument detection limit (INORGANIC) |
| B | Analyte found in blank and sample (ORGANIC) |
| D | Compound identified using secondary dilution factor (ORGANIC) |
| E | Concentration exceeds calibration range of instrument (ORGANIC) |
| E | Estimated due to interference (INORGANIC) |
| J | Estimated value, < sample's detection limit |
| N | Spiked recovery not within control limits (INORGANIC) |
| S | Determined by MSA (INORGANIC) |
| U | Undetected, analyzed for but not detected |
| W | Post-digest sample outside of control limit (INORGANIC) |

Selected Data Validation Qualifiers and Descriptions

| <u>Qualifier</u> | <u>Description</u> |
|------------------|---|
| A | Data is acceptable, with qualifications |
| JA | Estimated, acceptable |
| R | Data is rejected |
| V | Data is valid |
| Y | Analytical results in validation process |
| Z | Validation was not requested or performed |

17/17